THE

AMERICAN JOURNAL

OF

SCIENCE AND ARTS.

CONDUCTED BY

PROFESSORS B. SILLIMAN AND JAMES D. DANA,

IN CONNECTION WITH

PROFESSORS ASA GRAY, AND WOLCOTT GIBBS,
OF CAMBRIDGE,

AND

PROFESSORS H. A. NEWTON, S. W. JOHNSON,
GEO. J. BRUSH, AND A. E. VERRILL,
OF NEW HAVEN.

SECOND SERIES.

VOL. XLVII.—[WHOLE NUMBER, XCVII.]

Nos. 139, 140, 141.

JANUARY, MARCH, MAY.

WITH TWO PLATES.

NEW HAVEN: EDITORS.
1869.

PRINTED BY TUTTLE, MOREHOUSE & TAYLOR, 221 STATE ST.

CONTENTS OF VOL. XLVII.

NUMBER CXXXIX.

Page.

ART. I.—An account of the Meteor which burst over Weston in Connecticut, in December, 1807, and of the falling of stones on that occasion; by Professors SILLIMAN and KINGSLEY, ---------- 1

II.—On the distillation of dense Hydrocarbons at high temperatures, technically termed "Cracking;" by S. F. PECKHAM, ---------- 9

III.—On the Chromites of Magnesium; by W. R. NICHOLS, 16

IV.—Notices of papers in Physiological Chemistry—No. II; by GEORGE F. BARKER, ---------- 20

V.—Derivative Hypothesis of Life and Species; by Professor OWEN, ---------- 33

VI.—On some phenomena of Binocular Vision; by JOSEPH LECONTE, ---------- 68

VII.—On the Geology of Lower Louisiana and the Rock-salt Deposit of Petite Anse; by EUGENE W. HILGARD, ---- 77

VIII.—Notes on the recent volcanic disturbances of Hawaii; by Rev. TITUS COAN, ---------- 89

IX.—Geographical Notices; by D. C. GILMAN, ---------- 98

X.—Meteors of November 14th, 1868, ---------- 118

SCIENTIFIC INTELLIGENCE.

Physics and Chemistry.—Spectral analysis of the protuberances observed during a total eclipse of the sun, 127.—On the magnetism of chemical combinations, WIEDEMANN, 128.—On a new series of chemical reactions produced by light, TYNDALL, 129.—On the carbonaceous matter of meteorites: On the separation of Nickel and Cobalt from Manganese, by T. H. HENRY, 130.

Mineralogy and Geology.—Note on the supposed Fossil Footmarks in Kansas, by C. H. HITCHCOCK, 132.—On Ivigtite, by G. HAGEMANN, 133.—Notes on the Chemical Geology of the Gold-fields of California, by J. ARTHUR PHILLIPS, 134.—Gold in Rhinebeck, Dutchess county, New York, 139.

Botany.—Botanical Necrology for 1868, GEORGE A. WALKER-ARNOTT, 140: NATHANIEL BAGSHAW WARD, 141: EDWARD PŒPPIG, Dr. SCHNITZLEIN and FRANÇOIS DELESSERT, 142: HORACE MANN: Index to the Native and Scientific names of Indian and other Eastern Economic Plants and Objects, by J. FORBES WATSON: Synopsis Filicum, or Synopsis of all known Ferns, including the Osmundaceæ, Schizæaceæ, Marattiaceæ and Ophioglossaceæ, by Sir WILLIAM JACKSON HOOKER and JOHN GILBERT BAKER, 143.—Plantæ Wrightianæ Cubenses, WRIGHT, 144.

Miscellaneous Scientific Intelligence.—The Flow of the Great Lakes, 145.

Miscellaneous Bibliography.—How Crops Grow; a Treatise on the Chemical Composition, Structure and Life of the Plant, by SAMUEL W. JOHNSON, 147.—Outlines of Comparative Anatomy and Medical Zoology, by HARRISON ALLEN, 149.—A List of the Birds of New England, by ELLIOTT COUES: Synopsis of the Birds of South Carolina, by ELLIOTT COUES: The Butterflies of North America, by WM. H. EDWARDS: Extra Digits, by BURT G. WILDER: The Natural Wealth of California, &c., by TITUS TEY CRONISE, 150.—Outlines of Physiology, Human and Comparative, by JOHN MARSHALL: Reliquiæ Aquitanicæ: Geological Survey of Illinois, WORTHEN, 151.

Proceedings of Societies, 152.

NUMBER CXL.

Page.

ART. XI.—On some phenomena of Binocular Vision; by Prof. JOSEPH LECONTE, ... 153

XII.—Contributions to Chemistry from the Laboratory of the Lawrence Scientific School. No. 6.—On a new Salt containing Tin, Cæsium and Chlorine; by S. P. SHARPLES, 178

XIII.—Upon the Atomic Volumes of Liquids; by FRANK WIGGLESWORTH CLARKE, ... 180

XIV.—On the Occultator; by Prof. LEWIS R. GIBBES, ... 191

XV.—On the wave lengths of the Spectral Lines of the Elements; by WOLCOTT GIBBS, ... 194

XVI.—On the condition of our knowledge of the Processes in Luminous Flames; by EUGENE W. HILGARD, ... 218

XVII.—A notice of some Manuscripts in Central American Languages; by DANIEL G. BRINTON, ... 222

XVIII.—Notices of New Meteoric Irons in the United States; by CHARLES UPHAM SHEPARD, ... 230

XIX.—On Nitrification; by S. W. JOHNSON, ... 234

XX.—Geological Notes on the Andes of Ecuador; by JAMES ORTON, ... 242

XXI.—Observations upon Autumnal Foliage; by JOSEPH WHARTON, ... 251

XXII.—On a Modified Form of the Nitrate of Silver Test for Arsenic Acid; by CHARLES E. AVERY, ... 255

XXIII.—Notices of papers in Physiological Chemistry; by GEORGE F. BARKER. No. II. 258

XXIV.—A New Meteoric Iron—"The Wisconsin Meteorites"—with some remarks on the Widmanstättian Figures; by J. LAWRENCE SMITH, ... 271

SCIENTIFIC INTELLIGENCE.

Physics and Chemistry.—On the wave lengths of the metallic rays, THALEN, 272.—On spectral analyses: On a normal spectrum of the sun, FIZEAU: On the red protuberances from the surface of the sun, 273.—Further observations on the spectra of some of the stars and nebulæ, etc., HUGGINS, 274.

Mineralogy and Geology.—Recherches Anatomiques et Paléontológiques pour servir à l'histoire des Oiseaux fossiles de la France, par A. MILNE EDWARDS, 276.—Report on recent Explorations in the Gibraltar Caves, by FRED. BROME, 277.—On Calamiteæ and Fossil Equisetaceæ, by WILLIAM CARRUTHERS: Geological Map of New Jersey, by GEORGE H. COOK: New Geological Map of Wisconsin, by I. A. LAPHAM: Reliquiæ Aquitanicæ, 279.—Gold in Scotland, 280.

Botany and Zoology.—Field, Forest, and Garden Botany, a simple introduction to the common plants of the United States east of the Mississippi, both wild and cultivated, by ASA GRAY: Are Unios sensitive to light? note by C. A. WHITE, 280.—Critical Remarks on Halcyonoid Polyps; No. 3, by A. E. VERRILL, 282.—On the Distribution of Fresh-water Fishes in the Allegheny Region of South Western Virginia, by E. D. COPE: Catalogue of the Reptiles and Batrachians found in the vicinity of Springfield, Mass., with Notices of all other Species known to inhabit the State, by J. A. ALLEN, 285.—Notes on Radiata in the Museum of Yale College, No. 6.—Review of the Corals and Polyps of the West Coast of America, by A. E. VERRILL: Annual Report of the Trustees of the Museum of Comparative Zoology, 286.

Astronomy.—Meteors in August, 1868: Le Stelle Cadenti del Periodo di Agosto, osservate in Piemonte ed in altre Contrade d'Italia nel 1868: Error in Stanley's Logarithmic Tables, 287.

Miscellaneous Scientific Intelligence.—Convention of American Philologists, 287.—Gynæcological Society, of Boston, 288.—*Obituary.*—Carl Friederich Philipp von Martius, 288.—John Cassin, 291.—Prof. Theodore Strong, 293.—James David Forbes: Dr. Hörnes, 294.

Miscellaneous Bibliography.—Handbook of Chemistry, for School and Home use, by W. J. ROLFE and J. A. GILLET, 294.—Van Nostrand's Eclectic Engineering Magazine: Annual Report of the Board of Regents of the Smithsonian Institution: The Manufacturer and Builder: Blank Maps for marking the distribution of Plants and Animals, 295.—Le Naturaliste Canadien, 296.

Proceedings of Societies, etc., 296.

NUMBER CXLI.

Page.

ART. XXV.—On the Variability of Personal Equation in Transit Observations; by WILLIAM A. ROGERS, ... 297

XXVI.—Upon the Atomic Volumes of the Elements; by FRANK WIGGLESWORTH CLARKE, ... 308

XXVII.—Contributions from the Laboratory of the Lawrence Scientific School. No. 7.—On some Minerals from Newlin Township, Chester Co., Penn., described by Dr. Isaac Lea; by S. P. SHARPLES, ... 319

XXVIII.—On the Washing of Precipitates; by R. BUNSEN, 321

XXIX.—Note upon the origin of the Phosphatic Formation; by C. U. SHEPARD, Sr., ... 338

XXX.—A Point in the Geology of Western Vermont; by the Rev. J. B. PERRY, ... 341

XXXI.—On some derivatives of Trichlormethyl-sulphonchlorid, $(CCl_3)SO_2Cl$; by O. LOEW, ... 350

XXXII.—Note on the structure of the Blastoidea; by E. BILLINGS, ... 353

XXXIII.—Notes on the occurrence and composition of the Nodular Phosphates of South Carolina; by CHARLES U. SHEPARD, Jr. 354

XXXIV.—Notes on American Fossiliferous Strata; by T. A. CONRAD, ... 358

XXXV.—On certain Phenomena of Transmitted and Diffused Light; by M. CAREY LEA, ... 364

XXXVI.—Process for determining the Carbon chemically combined with Iron; by Prof. EGGERTZ, ... 374

XXXVII.—Geographical Notices; by D. C. GILMAN, ... 377

XXXVIII.—The Cohahuila Meteoric Irons of 1868, Mexico; by J. LAWRENCE SMITH, ... 383

XXXIX.—Atomic Ratio; by JOSIAH P. COOKE, Jr., ... 386

XL.—Notice of some New Reptilian Remains from the Cretaceous of Brazil; by Prof. O. C. MARSH, ... 390

XLI.—Notices of papers in Physiological Chemistry—No. II; by GEORGE F. BARKER, ... 393

XLII.—Meteors of November 14th, 1868; by H. A. NEWTON, 399

Page.

XLIII.—A proposed Arrangement for Observing the Corona, and Searching for intra-Mercurial Planets during a Total Eclipse of the Sun; by SIMON NEWCOMB, ... 413

SCIENTIFC INTELLIGENCE.

Physics and Chemistry.—On the refrangibility of the brilliant yellow ray of the sun's atmosphere, 415.—On the presence of the vapor of water in the neighborhood of the solar spots and on the spectral study of certain stars, 416.—Spectral observations of the star R in Gemini, SECCHI: On absorption lines produced by the passage of the solar light through chlorine, MORREN: On hydrogen in its relation to palladium, GRAHAM, 417.—Production of an artificial spectrum with a single Fraunhofer's line: On the analysis of different varieties of carbon, BERTHELOT, 418.—On the direct synthesis of Cyanhydric acid, BERTHELOT: On the Ammonium amalgam, LANDOLT, 420.—On a new method for preparing Carbonylic Sulphid, BERTHELOT: On Carbonylic Sulphid, BENDER, 422.—On carbonylic chlorid, and a new compound of this substance with platinum, SCHÜTZENBERGER, 423.—On the relation between boiling point and constitution of hydrocarbons, SCHORLEMMER, 424.—On a new source of octylic Alcohol, 425.—Tritylic (propylic) alcohol produced by fermentation: On the reduction of acetic oxyd to ethylic alcohol: On the alcohol obtained by the saponification of castor oil, 426.—On Sulpho-carbamid, 428.

Geology.—On a Mineral Phosphate from the island of Redonda, W. I.; by CHARLES UPHAM SHEPARD, 428.—Final Report on the Geology of New Jersey; by GEO. H. COOK, 430.

Zoology.—Are Unios sensitive to light? by ISAAC LEA, 430.

Miscellaneous Scientific Intelligence.—On the use of sodium in explosive powders, Dr. H. FLECK, 431.—Decrease in the Production of Gold, BLAKE, 432.—Dana's System of Mineralogy, 433.—*Obituary.*—J. Nicklès: William Mitchell, 434.

Miscellaneous Bibliography.—Handy Book of Meteorology, by ALEXANDER BUCHAN: Annual of Scientific Discovery, by SAMUEL KNEELAND, 434.—First Principles of Chemical Philosophy, by J. P. COOKE: Outlines of Physiology, Human and Comparative, by JOHN MARSHALL: The Ornithological Collection of John Cassin, 435.—Catalogue of the Orthoptera of North America, described previous to 1867, by S. H. SCUDDER: Memoirs of the Peabody Academy of Science: Bulletin of the Essex Institute, 436.

Proceedings of Societies, etc., 436.

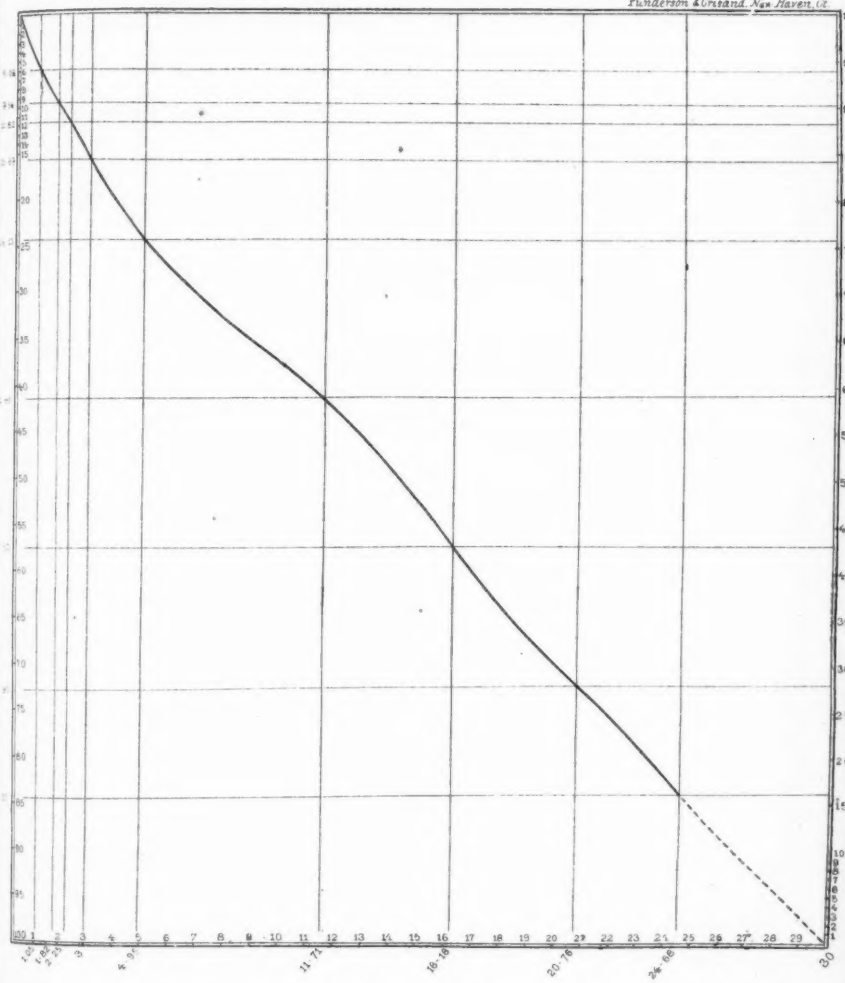
ERRATA.

Page 193, line 3 from top, for "declination" read "co-declination."
" 364, line 10 from bottom, read "one to two thousand."

CURVE

SHOWING THE LOSS OF INTENSITY IN ILLUMINATING GAS DUE TO ADMIXTURE OF AIR.

American Journal of Science & Arts, 2nd Series, Vol. XLVII. No. 142.



Note. 100 = maximum intensity. The vertical and horizontal scales are as 1-3.
The numerals on the left indicate the loss of light observed given in per centage.
The numerals on the lower line are the per centage volumes of air added as found by analysis of the mixture.
Below 84,55 pc. the curve is estimated.

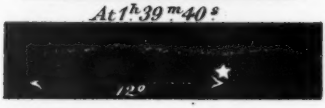
PLATE I.

APPEARANCE OF TRAIN AS SEEN AT NEW HAVEN.

At $1^h 15^m 40^s$

At $1^h 19^m 40^s$

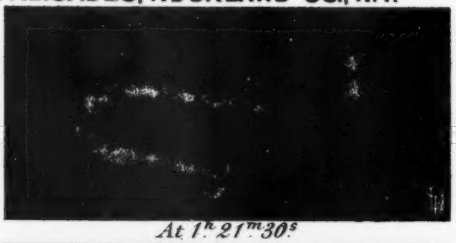
At $1^h 30^m 10^s$



At $1^h 39^m 40^s$

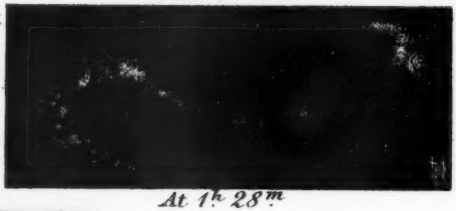
AS SEEN AT PALISADES, ROCKLAND CO., N.Y.

At $1^h 14^m 10^s$

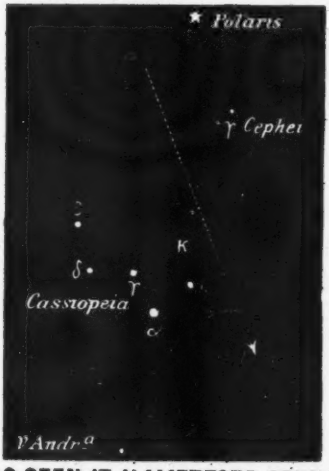


At $1^h 21^m 30^s$

At $1^h 18^m 10^s$



At $1^h 28^m$

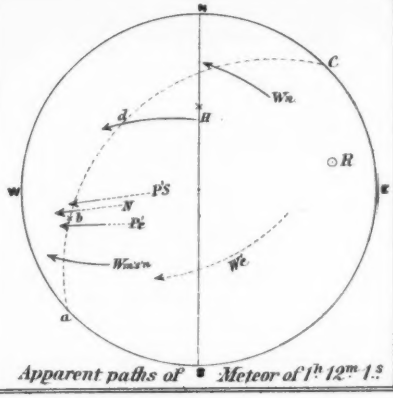


AS SEEN AT HAVERFORD, PENN.ª

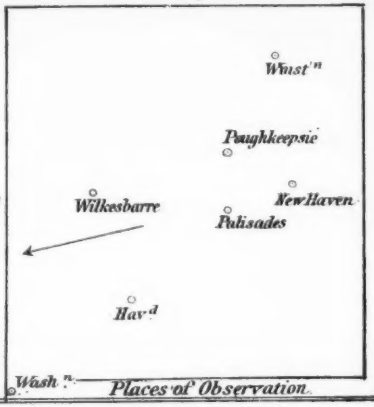
AS SEEN AT WILLIAMSTOWN MASS. $1^h 15^m$ AM. NOV. 14. 1868

METEOR OF $1^h 12^m 1^s$ N.Y.M.T. AS SEEN AT NEW HAVEN, Conn, PALISADES, N.Y., HAVERFORD, Pa., and Wmst'n. Mass. NOVEMBER 14. 1868.

PLATE II.

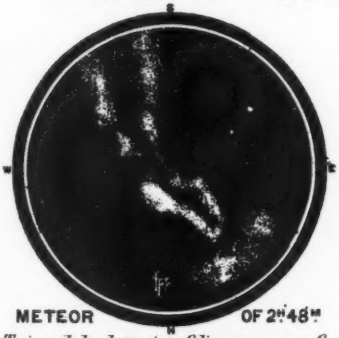


Apparent paths of Meteor of 1h 12m 1s



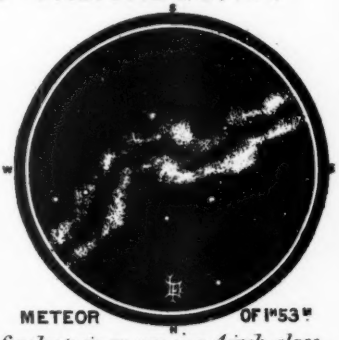
Places of Observation

METEORS SEEN AT PALISADES, N.Y.



METEOR OF 2h 48m

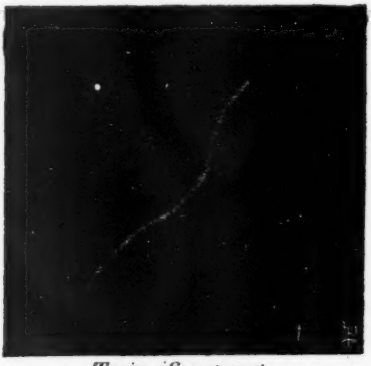
Train, and cloud at point of disappearance of meteor, as seen with a power of 40 linear in a 4in. glass.



METEOR OF 1h 53m

Smoky train as seen in a 4 inch glass; power of 40 linear Field of view 4½° of arc.

Meteor in Leo Minor just previous to disappearance. 11h 18m PM.



Train of a meteor at 11h 26m 30s Greyish cloud 2° to 3° long.

TRACKS OF SEVERAL PROMINENT METEORS, THEIR POINTS OF OBSERVATION TELESCOPIC VIEWS OF TRAINS &c.

NOV. 13-14 1868.